HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 **FAX: +82-31-645-6401**

FCC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
November 07, 2022

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2210-FC030-R1

FCC ID:	**A3LSMS911B**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-S911B/DS
Additional Model:	SM-S911B
EUT Type:	Mobile Phone
Average Output Power:	Ant.1&2 - 19.33 dBm
Frequency Range:	2412 MHz ~ 2472 MHz
Modulation type:	OFDM, OFDMA
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

Report prepared by : Sang Hoon Lee
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2210-FC030	October 21, 2022	- First Approval Report
HCT-RF-2210-FC030-R1	November 07, 2022	- Updated Output Power & P.S.D Contents

Table of Contents

1. EUT DESCRIPTION

Model	SM-S911B/DS	
Additional Model	SM-S911B	
EUT Type	Mobile Phone	
Power Supply	DC 3.88 V	
Frequency Range	2412 MHz ~ 2472 MHz	
Max. RF Output Power	Peak Power (For information only)	28.57 dBm
	Average Power	19.33 dBm
Modulation Type	OFDM, OFDMA	
Number of Channels	13 Channels	
Date(s) of Tests	September 06, 2022 ~ October 21, 2022	
Serial number	Radiated: R3CT90BE36R Conducted (WLAN 2.4G ax) : R3CT706PENK Conducted (WLAN 5G ax) : R3CT706PF2A	

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant.1	Ant.2	CDD	SDM
802.11ax	X	O	O	O

Note:

(1) O = Support, X = Not Support

(2) SISO = Single Input Single Output

(3) SDM = Spatial Diversity Multiplexing

(4) CDD = Cyclic Delay Diversity

(5) SISO test was performed for the MIMO test result.

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz or 6 GHz bands simultaneously on each antenna.

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on		
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on				
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on	
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on	

3. Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii)

Directional gain =

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Ant Gain (dBi)		N_{ANT}/ N_{SS}	Directional Gain (dBi)
ANT1	-2.01	2 / 2	-0.82
ANT2	-6.13		

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where GN is the gain of the nth antenna and NANT is the total number of antennas used.

Directional Gain = $10 \cdot \log(((10^{(\text{ANT1 Gain}/20)}+10^{(\text{ANT2 Gain}/20)})^2)/2)$ dBi

Sample MIMO Calculation:

Ex) Ant 1 : 11.58 dBm Ant 2 : 12.08 dBm

Ant1 + Ant 2 = MIMO

(11.58 dBm + 12.08 dBm) = (14.387 mW + 16.143 mW) = 30.53 mW = 14.88 dBm

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated d ata are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, R ep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Versio n :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Com mission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of §15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

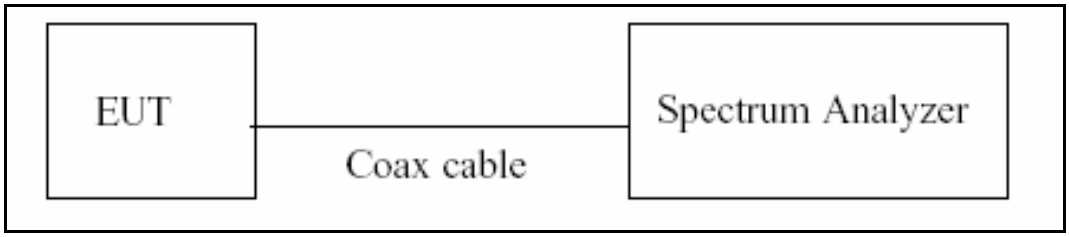
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, k=2)

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.

The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/*T*.

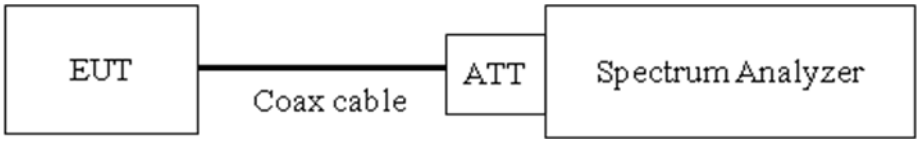
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 11.8.1 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Detector = Peak
4) Trace mode = max hold
5) Sweep = auto couple
6) Allow the trace to stabilize
7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

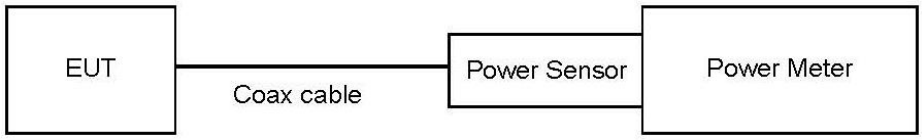
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

▪ Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)

: Measure the peak power of the transmitter.

▪ Average Power (Procedure 11.9.2.3 in ANSI 63.10-2013)

1) Measure the duty cycle.
2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

▪ Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss

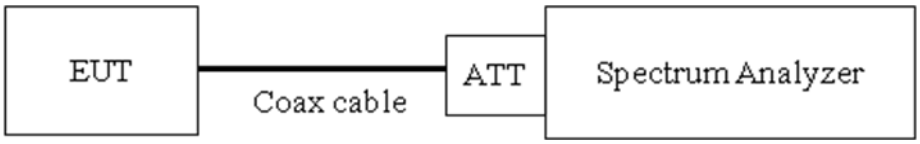
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3 kHz BW.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure 8.4 in KDB 558074 v05r02, Procedure 11.10 in ANSI 63.10-2013.

The spectrum analyzer is set to :

1) Set analyzer center frequency to DTS channel center frequency.
2) Set span to at least 1.5 times the OBW.
3) RBW = 3 kHz ≤ RBW ≤ 100 kHz.
4) VBW ≥ 3 x RBW.
5) Sweep = auto couple
6) Detector = power averaging (rms) or sample detector (when rms not available).
7) Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
8) Employ trace averaging (rms) mode over a minimum of 100 traces
9) Use the peak marker function to determine the maximum amplitude level.
10) Use the peak marker function to determine the maximum amplitude level within the RBW.
    If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11) if then duty factor shall be added to adjust the result if the duty cycle is less than 98 %

Sample Calculation

▪ Power Spectral Density = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

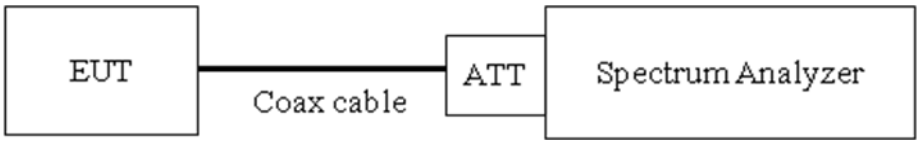
7.5. Conducted Band Edge (Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Average) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Set span to encompass the spectrum to be examined
4) Detector = Peak
5) Trace Mode = max hold
6) Sweep time = auto couple
7) Ensure that the number of measurement points ≥ 2 x Span/RBW
8) Allow trace to fully stabilize.
9) Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.04
100	20.09
200	20.13
300	20.19
400	20.22
500	20.23
600	20.23
700	20.25
800	20.27
900	20.29
1 000	20.31
2 000	20.46
2 400	20.52
2 480	20.52
2 500	20.52
3 000	20.57
4 000	20.67
5 000	20.75
5 150	20.77
5 850	20.82
6 000	20.82
7 000	20.91
8 000	20.98
9 000	21.05
10 000	21.12
11 000	21.16
12 000	21.24
13 000	21.32
14 000	21.30
15 000	21.32
16 000	21.37
17 000	21.41
18 000	21.47
19 000	21.50
20 000	21.56
21 000	21.77
22 000	21.74
23 000	21.94
24 000	21.77
25 000	21.80
26 000	21.80

Note : 1. 2 400 ~ 2 500 MHz is fundamental frequency range.

2. Factor = Attenuator loss(20 dB) + Cable loss(1ea)

3. EUT Cable : 0.35 dB → Total Port offset : 20.87 dB

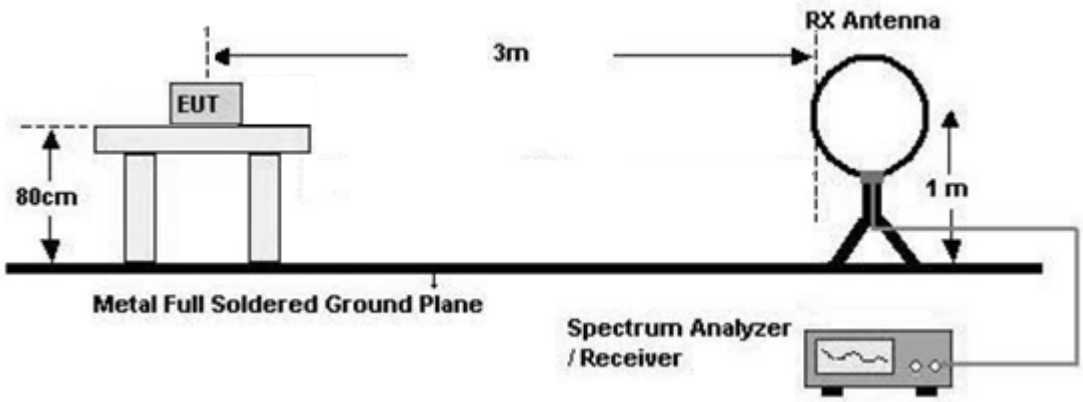
7.6. Radiated Test

Limit

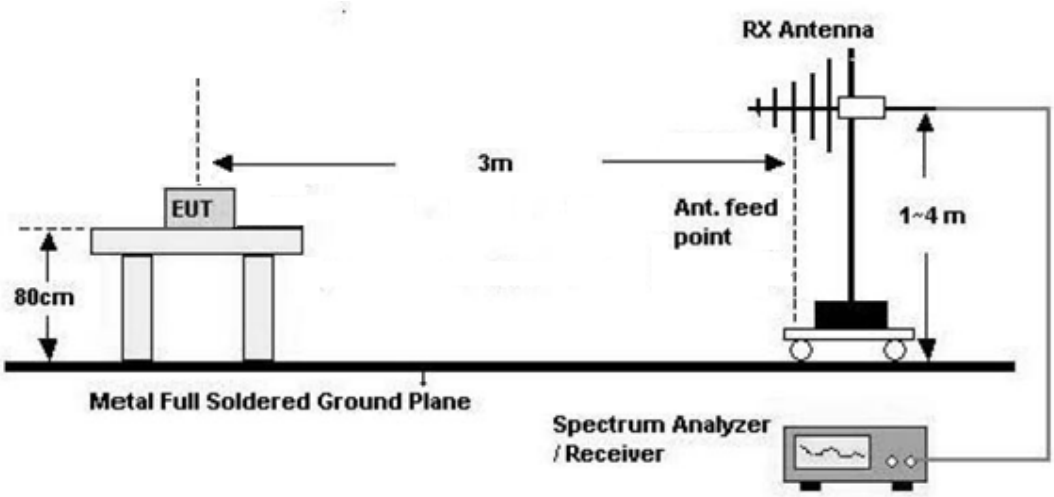
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

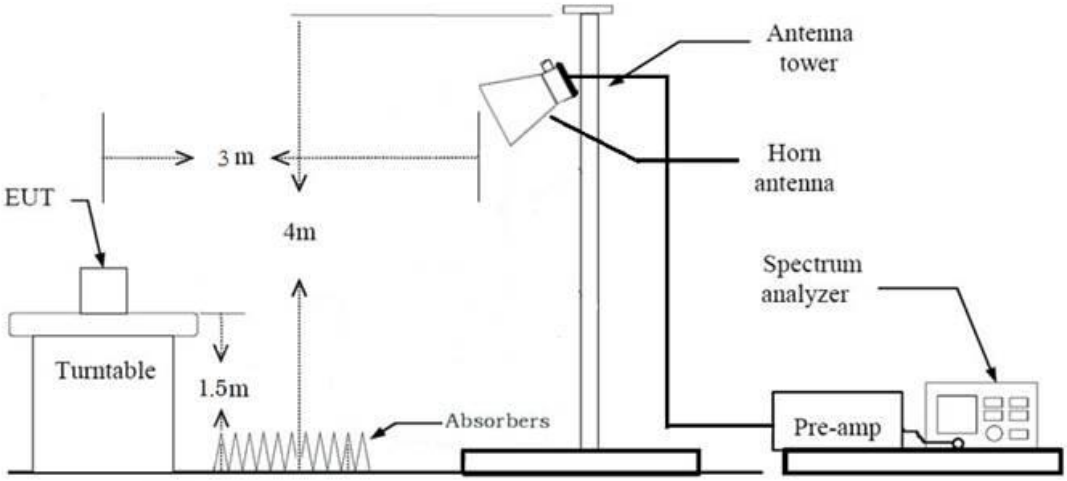
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions (Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

      In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak

- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

(2) Measurement Type(Average): Duty cycle ≥ 98 %

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98 %, duty cycle variations are less than ±2 %

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

    Total(Measurement Type : Average, Duty cycle ≥ 98 %)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

    Total(Measurement Type : Average, Duty cycle < 98 %)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)
    + Duty Cycle Factor

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW

   (2) Measurement Type(Average): Duty cycle ≥ 98 %,
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).

   (3) Measurement Type(Average): Duty cycle < 98 %, duty cycle variations are less than ±2 %
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).
      - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
      - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
    Total(Measurement Type : Average, Duty cycle ≥ 98 %)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
    Total(Measurement Type : Average, Duty cycle < 98 %)
    = Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) + Duty Cycle Factor

7.7. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[(a)]	56 to 46[(a)]
0.50 to 5	56	46
5 to 30	60	50

[(a)]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak (Final Result) = Measured Value + Correction Factor

7.8. Test RU offset for Tones

BW (MHz)	Tones (T)	RU offset	Test RU offset		
			Low	Mid	High
20	26	0~8	0	4	8
	52	37~40	37	38	40
	106	53~54	53	-	54
	242	61	-	61	-

7.9. Worst case configuration and mode

Conducted test

1. All data rate of operation were investigated and the worst case results are reported.
   (Worst case : MCS0)
2. Bandedge (Conducted)
   : All Mode (Channel, Tone, RU Offset) of operation were investigated and the worst case configuration results are reported.

Tone	Channel	RU Index
26	1, 11, 12, 13	0, 8
52	1, 11, 12, 13	37, 40
106	1, 11, 12, 13	53, 54
242	1, 11, 12, 13	61
SU	1, 11, 12, 13	-

3. SM-S911B/DS, SM-S911B were tested and the worst case results are reported.
(Worst case : SM-S911B/DS)

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories (Earphone, etc)
   - Worst case : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : X
   - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the worst case results are reported.
   (Worst case : MCS0)
4. All Antenna of operation were investigated and the worst case results are reported
   - Mode : Ant2(SISO), Ant1+Ant2(SDM), Ant1+Ant2(CDD)
   - Worst case : Ant1+Ant2(CDD)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane

6. All mode(Tone, RU Offset) of operation were investigated and the worst case configuration results are reported

TEST	TONE	RU OFFSET
RSE	WORST CASE : SU	-
	ADDITIONAL TONE : 26T, 52T, 106T,242T	26T : 8 52T : 40 106T : 54 242T : 61
Band-Edge	WORST CASE : 242T	61
	ADDITIONAL TONE : 26T, 52T, 106T, SU	Low Edge : 0, 37, 53 High Edge : 8, 40, 54

7. SM-S911B/DS, SM-S911B were tested and the worst case results are reported.
(Worst case : SM-S911B/DS)

Radiated test(RSDB)

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, Keyboard, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y
3. All of RSDB Scenario were investigated and the worst case configuration results are reported.
   - Worst case : 2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on		
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	**on**	**on**	**on**	**on**				
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on	
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on	

4. The following tables show the worst case configurations determined during testing.

(Worst case: The lowest margin condition the channels and modes were selected for test.)

RSDB Scenario	Description	2.4GHz Emission	5 GHz Emission
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	Antenna	Ant All	Ant All
	Channel	1	36
	Data Rate	MCS0	MCS 0
	Mode	802.11ax(HE20) SU	802.11ax(HE20) SU

5. SM-S911B/DS, SM-S911B were tested and the worst case results are reported.

(Worst case : SM-S911B/DS)

AC Power line Conducted Emissions

1. Please refer to the SM-S911B/DS [DTS] Test Report.

2. SM-S911B/DS, SM-S911B were tested and the worst case results are reported.

(Worst case : SM-S911B/DS)

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§15.247(d)	Conducted > 30 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 7.7		PASS (Note1)
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 7.6		PASS

Note1:

1. Please refer to the SM-S911B/DS [DTS] Test Report.

9. TEST RESULT

9.1 DUTY CYCLE

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	2.597	2.617	0.992	0.034
	52	MCS0	2.592	2.614	0.991	0.038
	106	MCS0	2.435	2.457	0.991	0.040
	242	MCS0	2.386	2.409	0.991	0.041
802.11ax(SU)	BW 20	MCS0	2.389	2.409	0.992	0.037

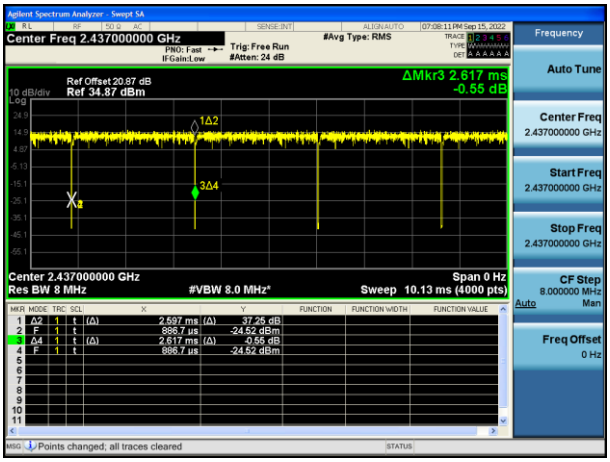
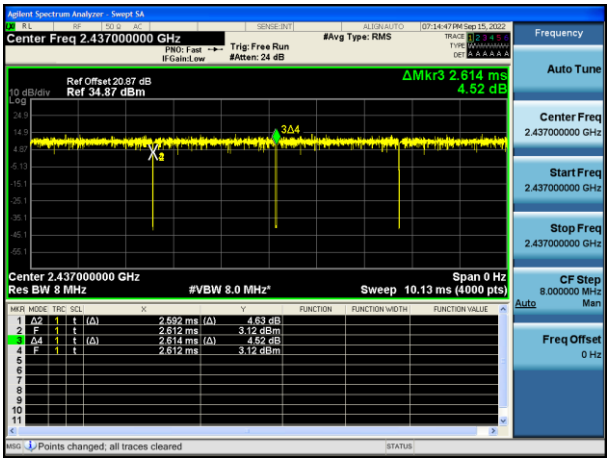
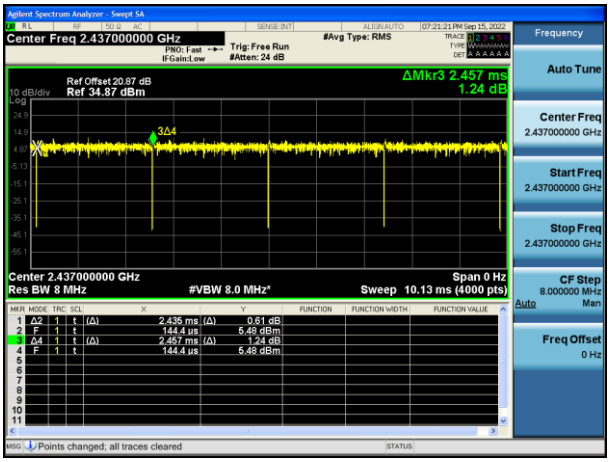
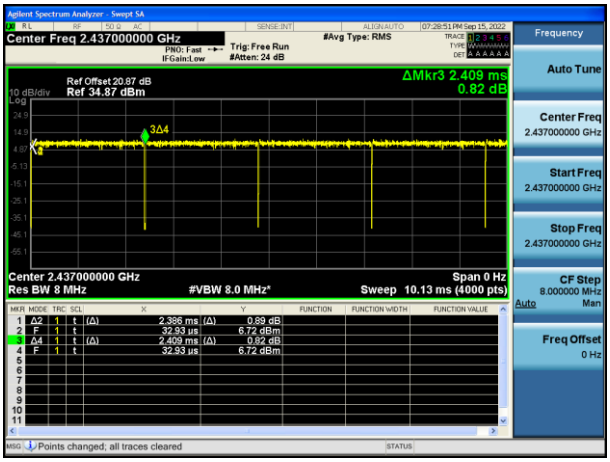
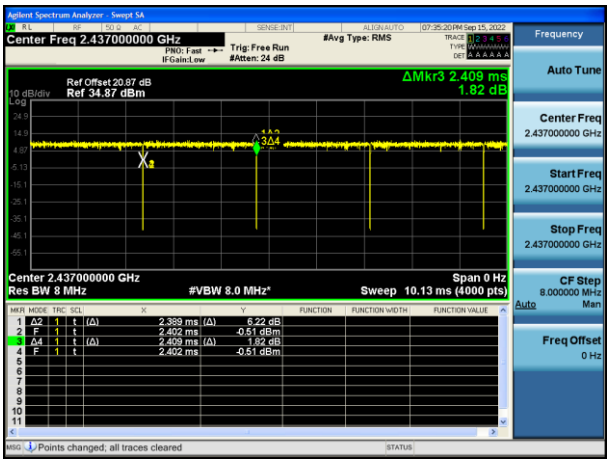
Note:

Duty cycle ≥ 98% ➔ Continuous Signal

▣ Test Plots

Note:

In order to simplify the report, attached plots were only the lowest datarate.

26 Tone MCS0	52 Tone MCS0
	
106 Tone MCS0	**242 Tone MCS0**
	
SU MCS0	
	

9.2 6 dB BANDWIDTH

[ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	6 dB BW (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.359	17.12	18.14	-	-
			Mid	2.706	15.11	-	19.07	19.08
			High	**2.165**	17.03	17.16	-	-
	2437	6	Low	2.141	17.12	18.15	-	-
			Mid	2.702	15.12	-	19.13	19.12
			High	**2.139**	17.08	17.17	-	-
	2462	11	Low	2.154	17.10	17.14	-	-
			Mid	2.705	15.09	-	19.11	19.11
			High	**2.140**	17.08	17.19	-	-
	2467	12	Low	2.143	17.09	17.16	-	-
			Mid	2.703	15.11	-	19.11	19.10
			High	**2.140**	17.08	17.17	-	-
	2472	13	Low	**2.137**	17.09	17.17	-	-
			Mid	2.703	15.10	-	19.09	19.09
			High	2.715	17.08	18.34	-	-

Limit : > 500 kHz

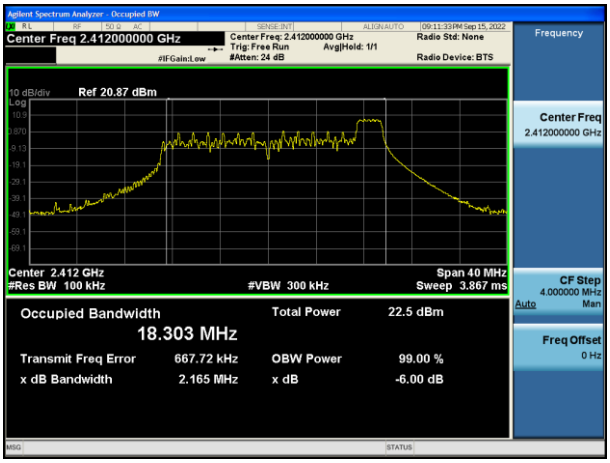
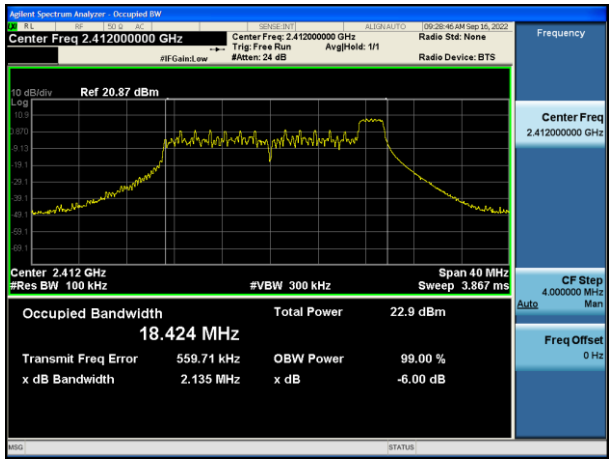
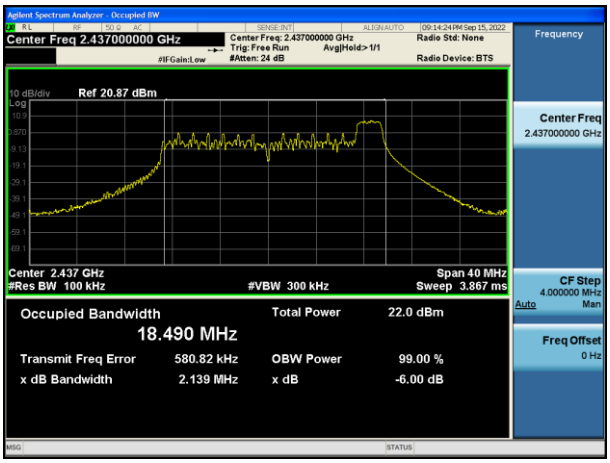
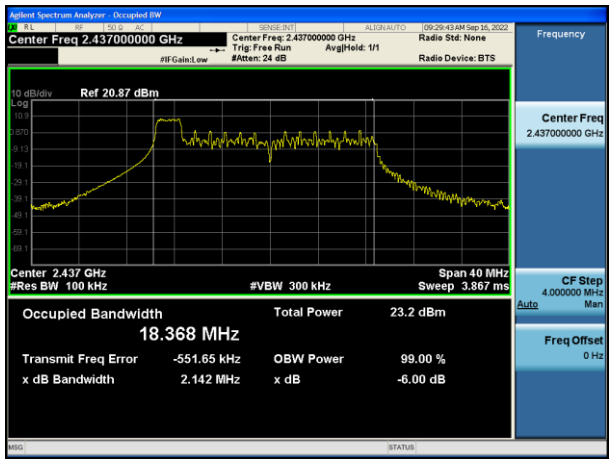
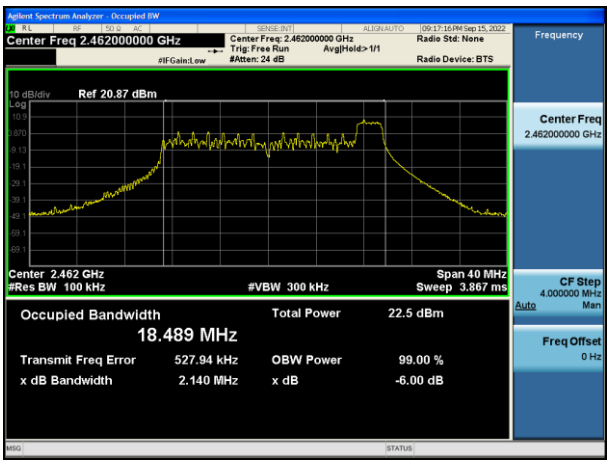
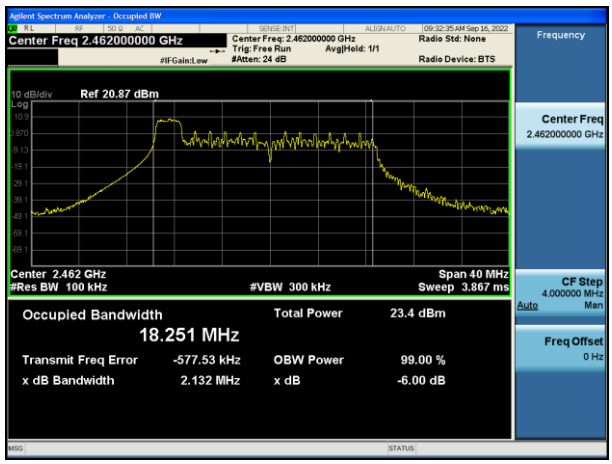
[ANT2]

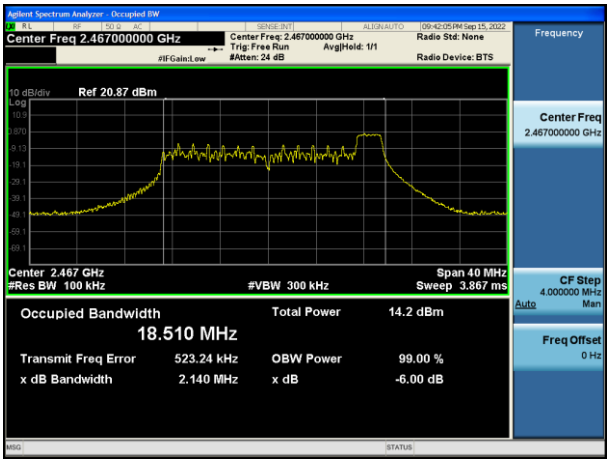
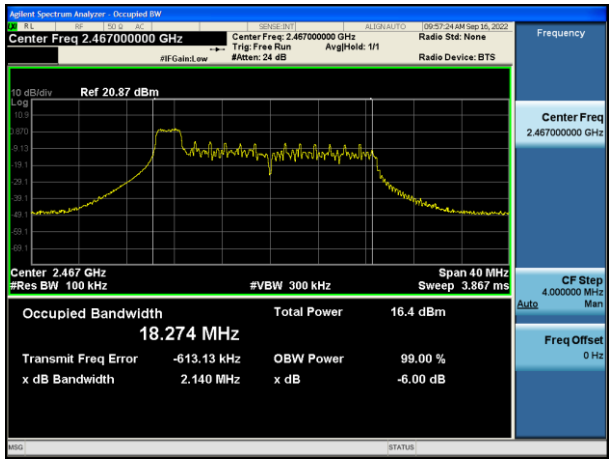
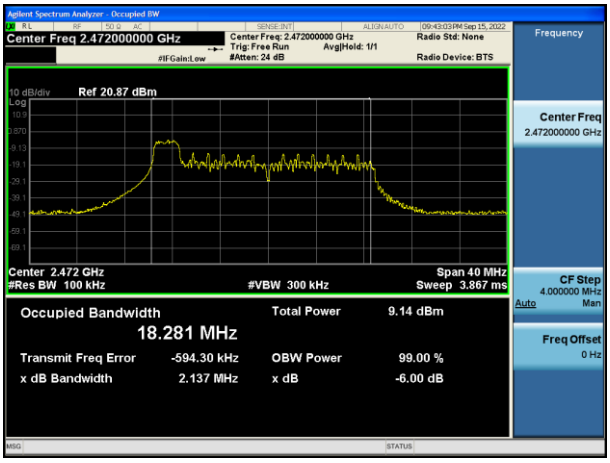
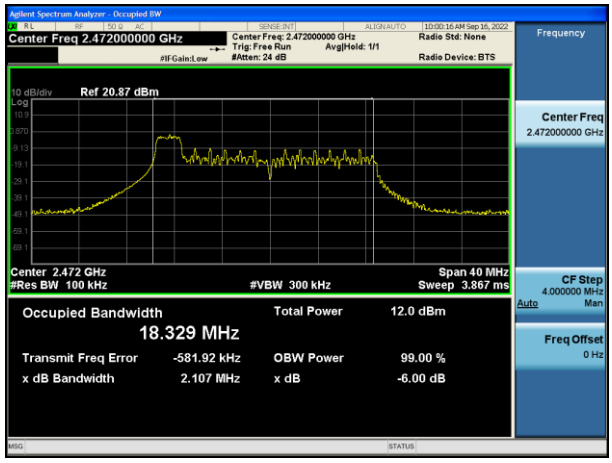
BW	Frequency [MHz]	Channel No.	RU Index	6 dB BW (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.143	17.12	17.17	-	-
			Mid	2.695	15.08	-	19.09	19.08
			High	**2.135**	17.06	17.17	-	-
	2437	6	Low	**2.142**	17.12	18.18	-	-
			Mid	2.702	15.13	-	19.11	19.12
			High	2.144	17.07	17.17	-	-
	2462	11	Low	**2.132**	17.09	17.16	-	-
			Mid	2.694	15.09	-	19.03	19.04
			High	2.140	17.09	18.38	-	-
	2467	12	Low	**2.140**	10.83	17.14	-	-
			Mid	2.249	8.88	-	19.04	19.05
			High	2.215	17.11	18.39	-	-
	2472	13	Low	**2.107**	17.10	17.17	-	-
			Mid	2.167	15.13	-	19.11	19.11
			High	2.122	17.08	17.17	-	-

Limit : > 500 kHz

▣ Test Plots

Note: In order to simplify the report, attached plots were only the narrowest 6 dB BW channel.

ANT1	ANT2
BW20M Ch.1(2412 MHz) RU 8	**BW20M Ch.1(2412 MHz) RU 8**
	
BW20M Ch.6(2437 MHz) RU 8	**BW20M Ch.6(2437 MHz) RU 0**
	
BW20M Ch.11(2462 MHz) RU 8	**BW20M Ch.11(2462 MHz) RU 0**
	

ANT1	ANT2
BW20M Ch.12(2467 MHz) RU 8	**BW20M Ch.12(2467 MHz) RU 0**
	
BW20M Ch.13(2472 MHz) RU 0	**BW20M Ch.13(2472 MHz) RU 0**
	

9.3 OUTPUT POWER

Peak Power

Power Meter offset = Attenuator loss (20 dB) + Cable loss + EUT Cable loss

[SISO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	22.53	23.59	24.74	-	-
			Mid	23.41	23.90	-	25.94	25.90
			High	23.30	23.78	24.27	-	-
	2437	6	Low	22.98	23.85	24.12	-	-
			Mid	22.44	23.60	-	25.98	25.92
			High	23.61	24.13	24.75	-	-
	2462	11	Low	23.25	24.32	25.16	-	-
			Mid	23.00	24.26	-	25.99	26.02
			High	22.89	23.57	24.16	-	-
	2467	12	Low	15.79	15.42	15.05	-	-
			Mid	14.94	14.91	-	13.89	13.93
			High	15.04	14.74	14.30	-	-
	2472	13	Low	9.72	9.20	9.09	-	-
			Mid	8.72	8.78	-	8.18	8.07
			High	9.54	9.01	8.71	-	-

Limit : 30 dBm

[MIMO(ANT1)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT1 Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	21.51	22.36	23.56	-	-
			Mid	22.22	22.71	-	25.14	25.16
			High	22.82	23.42	23.58	-	-
	2437	6	Low	21.84	22.49	23.15	-	-
			Mid	21.63	22.41	-	24.59	24.55
			High	22.46	22.82	23.51	-	-
	2462	11	Low	22.72	23.44	24.40	-	-
			Mid	22.06	23.30	-	25.02	24.95
			High	22.40	23.21	23.78	-	-
	2467	12	Low	12.70	12.33	12.02	-	-
			Mid	12.19	12.05	-	11.00	11.01
			High	12.66	12.00	11.57	-	-
	2472	13	Low	7.29	6.40	6.33	-	-
			Mid	6.20	6.26	-	5.38	5.40
			High	6.39	6.03	5.82	-	-

Limit : 30 dBm

[MIMO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	22.53	23.59	24.74	-	-
			Mid	23.41	23.90	-	25.94	25.90
			High	23.30	23.78	24.27	-	-
	2437	6	Low	22.98	23.85	24.12	-	-
			Mid	22.44	23.60	-	25.98	25.92
			High	23.61	24.13	24.75	-	-
	2462	11	Low	23.25	24.32	25.16	-	-
			Mid	23.00	24.26	-	25.99	26.02
			High	22.89	23.57	24.16	-	-
	2467	12	Low	15.79	15.42	15.05	-	-
			Mid	14.94	14.91	-	13.89	13.93
			High	15.04	14.74	14.30	-	-
	2472	13	Low	9.72	9.20	9.09	-	-
			Mid	8.72	8.78	-	8.18	8.07
			High	9.54	9.01	8.71	-	-

Limit : 30 dBm

[MIMO(ANT1+ANT2)]

1. MIMO Peak Power = 10·log((10^(Ant1 Peak power /10))+(10^(Ant2 Peak power /10)))

BW	Frequency [MHz]	Channel No.	RU Index	MIMO Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	25.06	26.03	27.20	-	-
			Mid	25.87	26.35	-	28.57	28.55
			High	26.08	26.62	26.95	-	-
	2437	6	Low	25.46	26.24	26.67	-	-
			Mid	25.07	26.06	-	28.35	28.30
			High	26.09	26.53	27.19	-	-
	2462	11	Low	26.01	26.91	27.81	-	-
			Mid	25.56	26.82	-	28.54	28.53
			High	25.66	26.40	26.99	-	-
	2467	12	Low	17.52	17.15	16.80	-	-
			Mid	16.79	16.72	-	15.69	15.72
			High	17.02	16.59	16.16	-	-
	2472	13	Low	11.68	11.03	10.93	-	-
			Mid	10.65	10.71	-	10.01	9.95
			High	11.25	10.78	10.51	-	-

Limit : 30 dBm

Average Power

Power Meter offset = Attenuator loss(20 dB) + Cable loss + EUT Cable

[SISO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	12.06	13.25	15.02	-	-
			Mid	12.45	13.56	-	16.70	16.65
			High	12.27	13.40	14.29	-	-
	2437	6	Low	12.71	13.63	14.26	-	-
			Mid	12.09	13.30	-	16.85	16.85
			High	13.01	13.96	15.11	-	-
	2462	11	Low	13.03	14.11	15.51	-	-
			Mid	12.55	14.03	-	16.78	16.75
			High	11.82	12.99	13.96	-	-
	2467	12	Low	5.79	5.49	5.19	-	-
			Mid	4.42	4.81	-	4.74	4.75
			High	4.48	4.30	4.24	-	-
	2472	13	Low	-0.58	-0.78	-0.88	-	-
			Mid	-1.76	-1.41	-	-1.11	-1.10
			High	-1.32	-1.39	-1.34	-	-

Limit : 30 dBm

[MIMO(ANT1)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT1 Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	10.56	11.71	13.36	-	-
			Mid	11.65	12.25	-	15.91	15.90
			High	12.20	13.05	13.78	-	-
	2437	6	Low	11.60	12.27	13.20	-	-
			Mid	11.11	12.05	-	15.35	15.32
			High	11.77	12.44	13.59	-	-
	2462	11	Low	12.30	13.38	14.49	-	-
			Mid	11.64	13.10	-	15.81	15.78
			High	11.54	12.63	13.78	-	-
	2467	12	Low	2.47	2.19	2.02	-	-
			Mid	1.67	1.79	-	1.80	1.79
			High	1.78	1.56	1.54	-	-
	2472	13	Low	-3.33	-3.63	-3.57	-	-
			Mid	-4.21	-3.93	-	-3.85	-3.86
			High	-4.60	-4.49	-4.22	-	-

Limit : 30 dBm

[MIMO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	12.06	13.25	15.02	-	-
			Mid	12.45	13.56	-	16.70	16.65
			High	12.27	13.40	14.29	-	-
	2437	6	Low	12.71	13.63	14.26	-	-
			Mid	12.09	13.30	-	16.85	16.85
			High	13.01	13.96	15.11	-	-
	2462	11	Low	13.03	14.11	15.51	-	-
			Mid	12.55	14.03	-	16.78	16.75
			High	11.82	12.99	13.96	-	-
	2467	12	Low	5.79	5.49	5.19	-	-
			Mid	4.42	4.81	-	4.74	4.75
			High	4.48	4.30	4.24	-	-
	2472	13	Low	-0.58	-0.78	-0.88	-	-
			Mid	-1.76	-1.41	-	-1.11	-1.10
			High	-1.32	-1.39	-1.34	-	-

Limit : 30 dBm

[MIMO(ANT1+ANT2)]

1. MIMO Average Power = 10·log(((10^(Ant1 Average power /10))+(10^(Ant2 Average power /10)))

BW	Frequency [MHz]	Channel No.	RU Index	MIMO Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	14.39	15.56	17.28	-	-
			Mid	15.08	15.96	-	19.33	19.31
			High	15.24	16.24	17.05	-	-
	2437	6	Low	15.20	16.01	16.77	-	-
			Mid	14.64	15.73	-	19.17	19.17
			High	15.45	16.28	17.42	-	-
	2462	11	Low	15.69	16.78	18.04	-	-
			Mid	15.13	16.60	-	19.33	19.30
			High	14.69	15.82	16.88	-	-
	2467	12	Low	7.45	7.16	6.90	-	-
			Mid	6.27	6.56	-	6.52	6.53
			High	6.35	6.16	6.11	-	-
	2472	13	Low	1.27	1.03	0.99	-	-
			Mid	0.20	0.52	-	0.75	0.75
			High	0.35	0.34	0.46	-	-

Limit : 30 dBm

9.4 POWER SPECTRAL DENSITY

Note :

1. Spectrum Measured Levels are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset Attenuator loss(20 dB) + Cable loss + EUT Cable
3. Total PSD = Measured Value + Duty Cycle Factor

[SISO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-4.845	-6.463	-7.832	-	-
			Mid	-4.717	-6.292	-	-9.598	-9.313
			High	-4.882	-6.488	-8.313	-	-
	2437	6	Low	-3.746	-5.979	-8.227	-	-
			Mid	-4.742	-6.395	-	-8.976	-9.017
			High	-3.385	-5.484	-7.281	-	-
	2462	11	Low	-3.844	-5.379	-6.795	-	-
			Mid	-4.325	-5.566	-	-8.797	-8.825
			High	-4.574	-6.816	-8.541	-	-
	2467	12	Low	-10.856	-13.922	-17.198	-	-
			Mid	-12.581	-14.395	-	-20.715	-20.731
			High	-12.265	-15.290	-18.373	-	-
	2472	13	Low	-17.248	-20.385	-23.359	-	-
			Mid	-18.709	-21.168	-	-26.751	-26.945
			High	-17.952	-20.987	-23.677	-	-

Limit : 8 dBm

[MIMO(ANT1)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT1 Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-6.382	-7.991	-9.076	-	-
			Mid	-5.452	-7.536	-	-9.963	-9.562
			High	-4.591	-6.891	-9.183	-	-
	2437	6	Low	-5.394	-7.411	-9.668	-	-
			Mid	-5.815	-7.614	-	-10.659	-10.574
			High	-5.399	-7.445	-8.995	-	-
	2462	11	Low	-4.885	-6.359	-8.370	-	-
			Mid	-5.437	-6.570	-	-10.171	-9.993
			High	-5.494	-7.148	-9.200	-	-
	2467	12	Low	-14.615	-17.341	-20.454	-	-
			Mid	-15.229	-17.730	-	-24.037	-24.045
			High	-15.153	-18.110	-21.165	-	-
	2472	13	Low	-20.273	-23.285	-26.392	-	-
			Mid	-21.136	-23.390	-	-29.361	-29.734
			High	-21.445	-23.743	-27.124	-	-

Limit : 8 dBm

[MIMO(ANT2)]

BW	Frequency [MHz]	Channel No.	RU Index	ANT2 Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-4.845	-6.463	-7.832	-	-
			Mid	-4.717	-6.292	-	-9.598	-9.313
			High	-4.882	-6.488	-8.313	-	-
	2437	6	Low	-3.746	-5.979	-8.227	-	-
			Mid	-4.742	-6.395	-	-8.976	-9.017
			High	-3.385	-5.484	-7.281	-	-
	2462	11	Low	-3.844	-5.379	-6.795	-	-
			Mid	-4.325	-5.566	-	-8.797	-8.825
			High	-4.574	-6.816	-8.541	-	-
	2467	12	Low	-10.856	-13.922	-17.198	-	-
			Mid	-12.581	-14.395	-	-20.715	-20.731
			High	-12.265	-15.290	-18.373	-	-
	2472	13	Low	-17.248	-20.385	-23.359	-	-
			Mid	-18.709	-21.168	-	-26.751	-26.945
			High	-17.952	-20.987	-23.677	-	-

Limit : 8 dBm

[MIMO(ANT1+ANT2)]

1. MIMO Total PSD = 10·log(((10^(Ant1 Total PSD /10))+(10^(Ant2 Total PSD /10)))

BW	Frequency [MHz]	Channel No.	RU Index	MIMO Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-2.536	-4.150	-5.399	-	-
			Mid	-2.059	-3.859	-	-6.766	-6.426
			High	**-1.724**	-3.674	-5.715	-	-
	2437	6	Low	-1.482	-3.626	-5.877	-	-
			Mid	-2.235	-3.952	-	-6.726	-6.716
			High	**-1.266**	-3.344	-5.043	-	-
	2462	11	Low	**-1.323**	-2.831	-4.501	-	-
			Mid	-1.835	-3.029	-	-6.419	-6.360
			High	-2.000	-3.968	-5.847	-	-
	2467	12	Low	**-9.331**	-12.293	-15.517	-	-
			Mid	-10.696	-12.740	-	-19.055	-19.069
			High	-10.463	-13.465	-16.538	-	-
	2472	13	Low	**-15.492**	-18.587	-21.605	-	-
			Mid	-16.745	-19.128	-	-24.852	-25.109
			High	-16.346	-19.140	-22.056	-	-

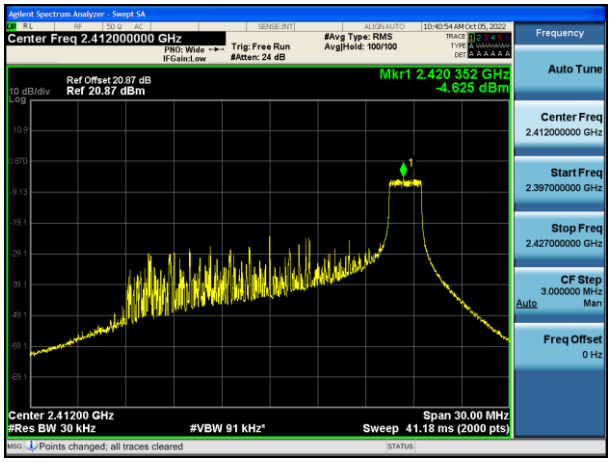
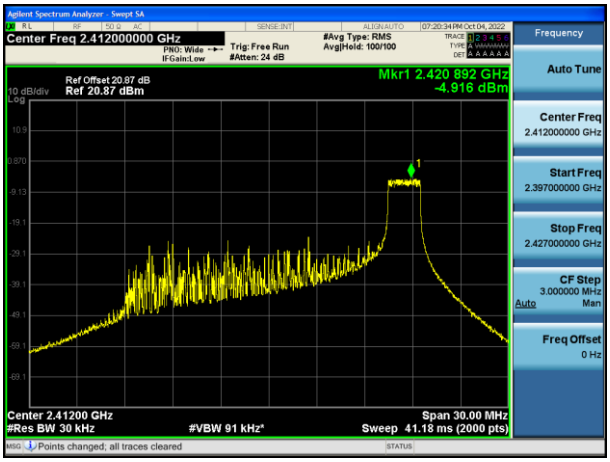
Limit : 8 dBm

▣ Test Plots

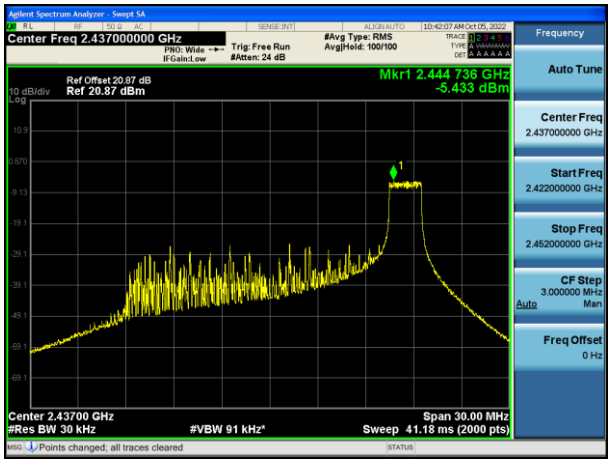
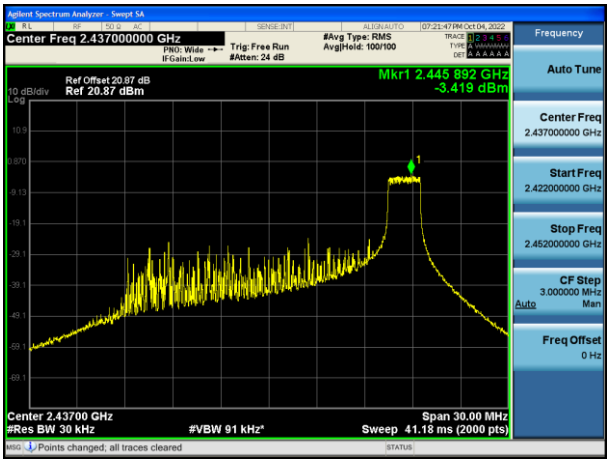
Note:

1. In order to simplify the report, attached plots were only the worst case PSD channel.
2. SUM PSD = 10·log(((10^(Ant1 PSD /10))+(10^(Ant2 PSD /10)))
3. MIMO Total PSD = SUM PSD + Duty Cycle Factor

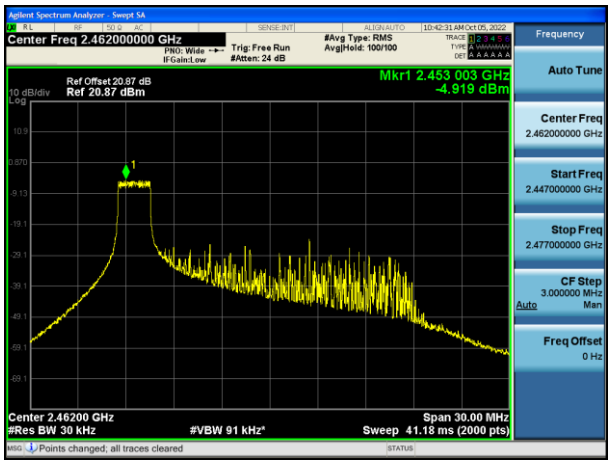
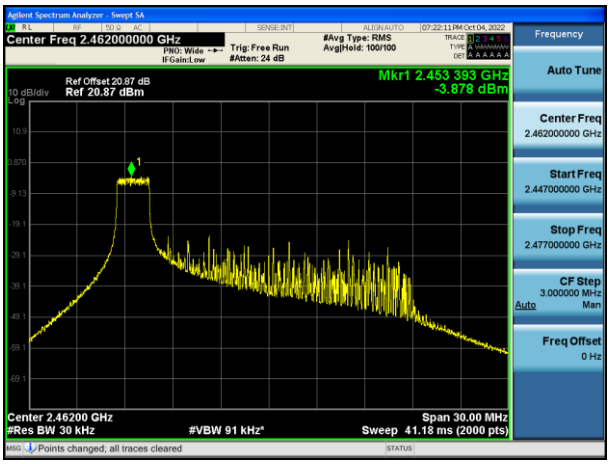
[MIMO(ANT1+ANT2)]

BW20M Ch.1(2412 MHz) RU 8	
Ant1	**Ant2**
	

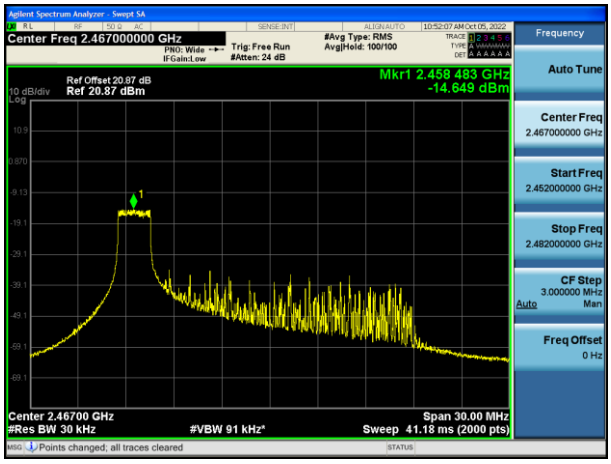
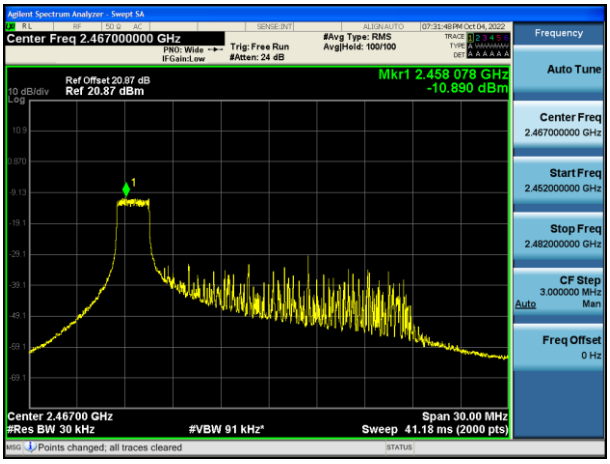
SUM PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-1.758	0.034	-1.724

BW20M Ch.6(2437 MHz) RU 8	
Ant1	Ant2
	

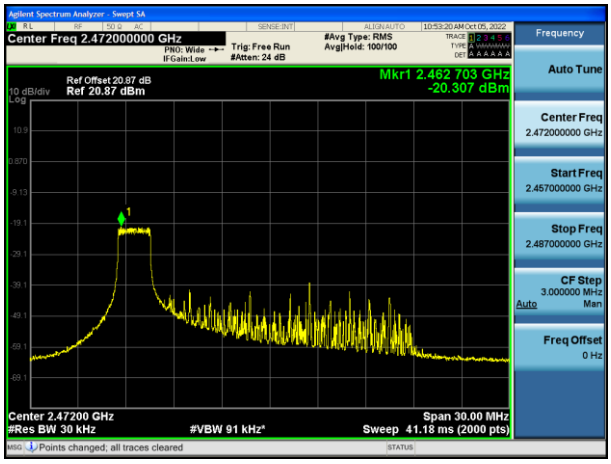
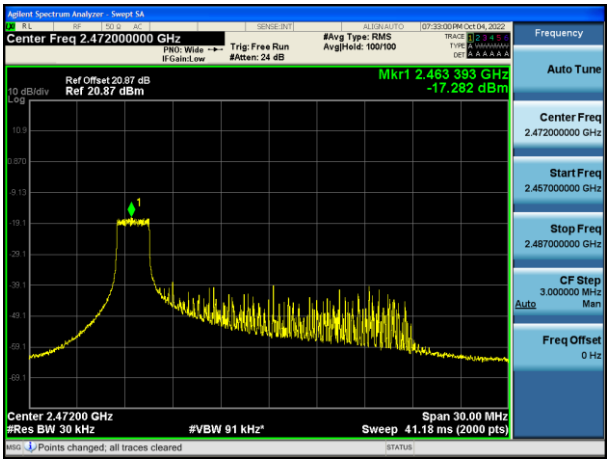
SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-1.300	0.034	-1.266

BW20M Ch.11(2462 MHz) RU 0	
Ant1	Ant2
	

SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-1.357	0.034	-1.323

BW20M Ch.12(2467 MHz) RU 0	
Ant1	**Ant2**
	

SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-9.365	0.034	-9.331

BW20M Ch.13(2472 MHz) RU 0	
Ant1	**Ant2**
	

SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-15.526	0.034	-15.492

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

[Ant1]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	33.986	33.331	**32.884**
	2462	11	High	Highest Bandedge	52.414	51.453	47.000
	2467	12	High	Highest Bandedge	42.292	39.673	38.141
	2472	13	High	Highest Bandedge	30.643	30.615	**30.081**

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	33.921	34.699
	2462	11		Highest Bandedge	**45.650**	45.983
	2467	12		Highest Bandedge	36.598	**35.496**
	2472	13		Highest Bandedge	30.324	30.913

Limit : 30 dBc

[Ant2]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	34.062	33.857	31.905
	2462	11	High	Highest Bandedge	52.754	50.574	43.030
	2467	12	High	Highest Bandedge	45.263	42.940	40.256
	2472	13	High	Highest Bandedge	30.465	30.539	**30.197**

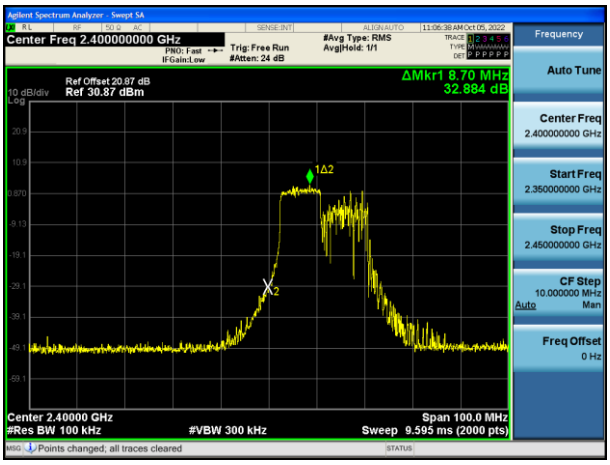
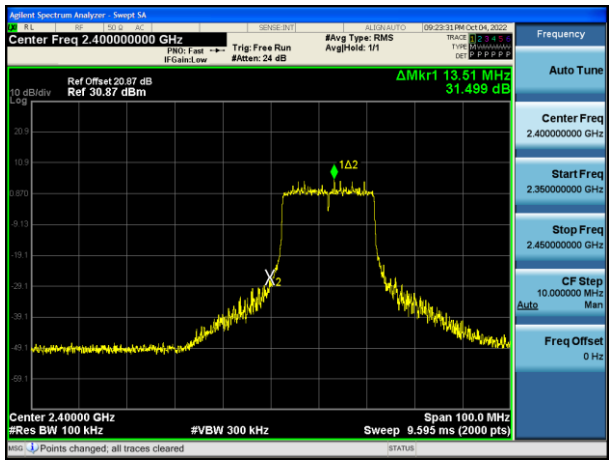
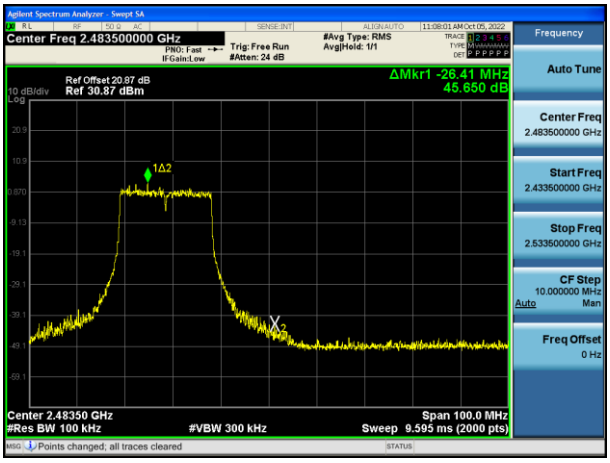
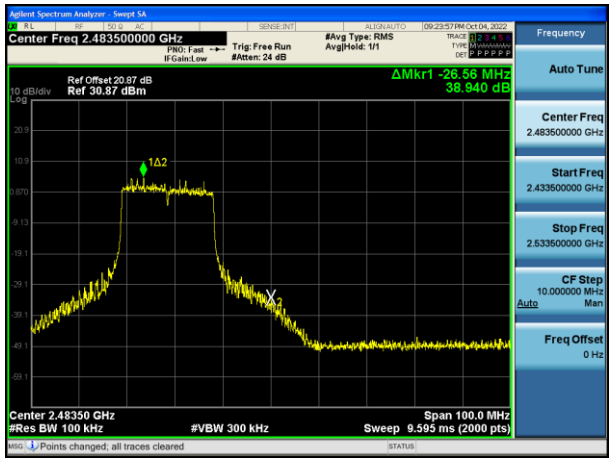
BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	33.046	**31.499**
	2462	11		Highest Bandedge	39.095	**38.940**
	2467	12		Highest Bandedge	39.848	**38.640**
	2472	13		Highest Bandedge	30.863	30.335

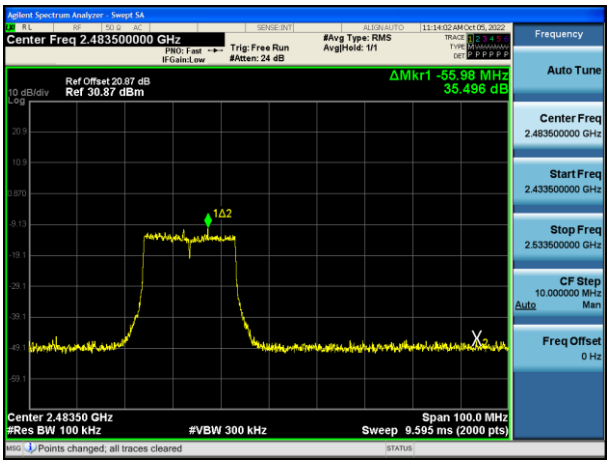
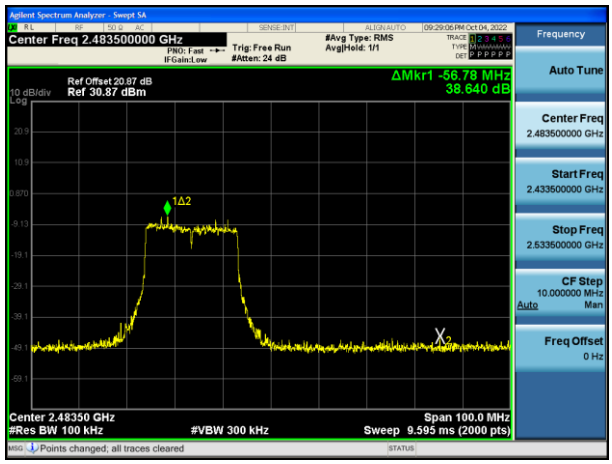
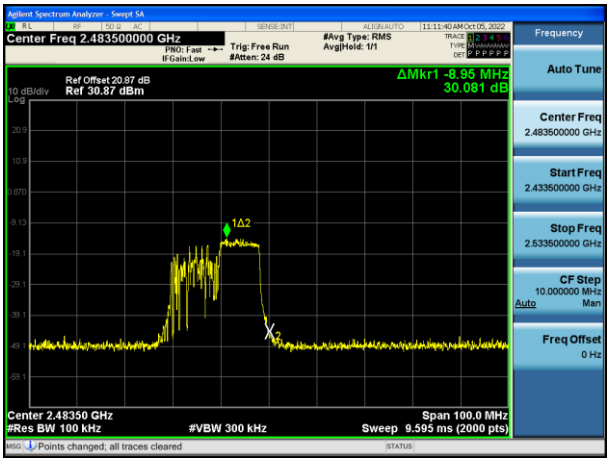
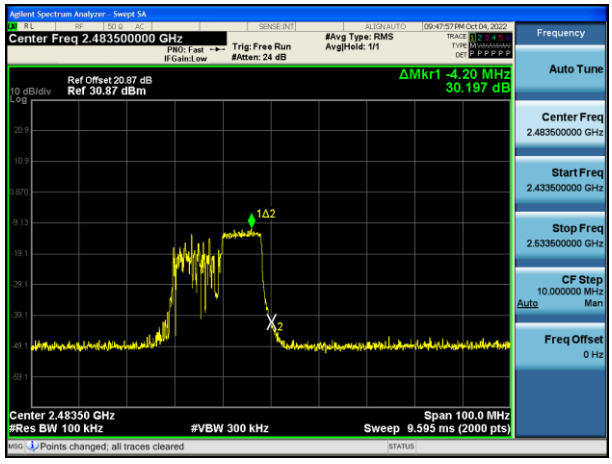
Limit : 30 dBc

▣ Test Plots

Note: In order to simplify the report, attached plots were only the worst case.

[Ant1]

Ant1	Ant2
BW 20M Ch.1(2412 MHz) 106T RU 53	**BW 20M Ch.1(2412 MHz) SU**
	
BW 20M Ch.11(2462 MHz) 242T RU 61	**BW 20M Ch.11(2462 MHz) SU**
	

Ant1	Ant2
BW 20M Ch.12(2467 MHz) SU	**BW 20M Ch.12(2467 MHz) SU**
	
BW 20M Ch.13(2472 MHz) 106T RU 54	**BW 20M Ch.13(2472 MHz) 106T RU 54**
	

Conducted Spurious Emissions

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

[ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	51.548	50.105	49.477	-	-
			Mid	53.580	49.563	-	48.572	48.060
			High	53.602	52.117	49.070	-	-
	2437	6	Low	53.200	50.331	49.067	-	-
			Mid	52.908	50.845	-	49.919	**47.073**
			High	51.627	51.192	48.431	-	-
	2462	11	Low	52.529	52.168	48.383	-	-
			Mid	51.293	51.031	-	47.752	49.501
			High	52.068	50.995	50.465	-	-

[ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	52.201	51.633	50.841	-	-
			Mid	53.203	52.031	-	49.282	51.666
			High	52.873	50.473	49.802	-	-
	2437	6	Low	53.524	50.972	**48.542**	-	-
			Mid	51.306	51.973	-	48.668	50.149
			High	53.530	52.979	50.359	-	-
	2462	11	Low	52.937	51.851	51.695	-	-
			Mid	53.084	53.023	-	48.743	49.122
			High	52.162	52.218	49.477	-	-

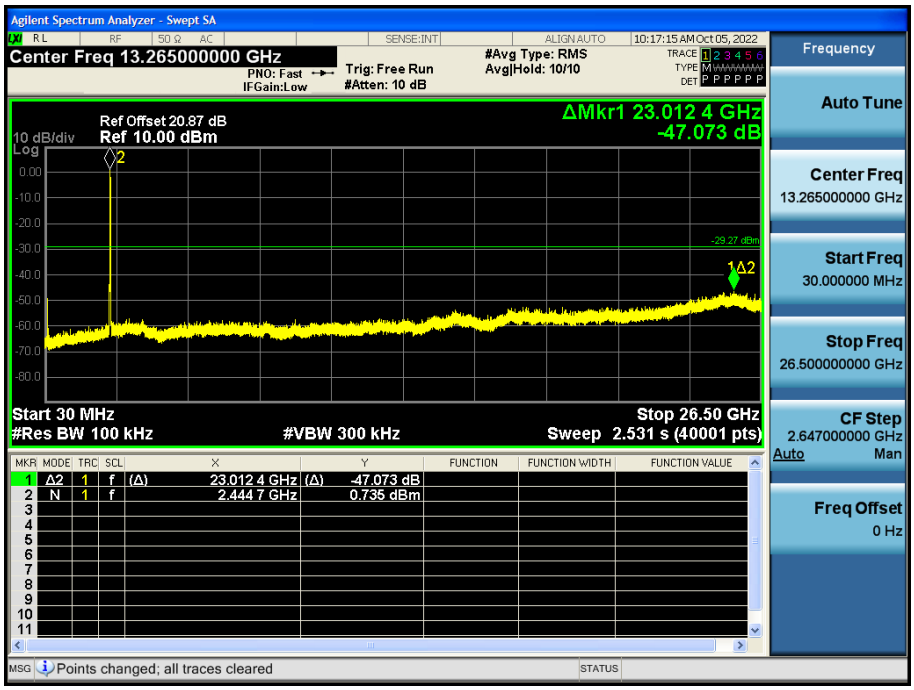
Limit : 30 dBc

▣ Test Plots

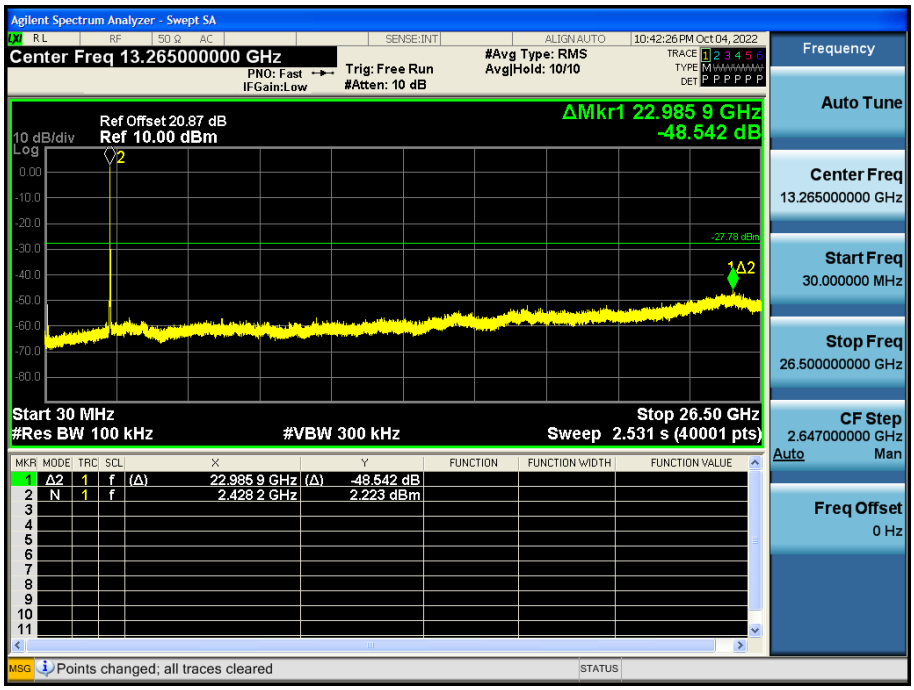
Note:

In order to simplify the report, attached plots were only the worst case.

[ANT1] BW20M Ch.6(2437 MHz) SU



[ANT2] BW20M Ch.6(2437 MHz) 106T RU 53



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	POL	Total	Limit	Margin
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

[MIMO]

1. 26 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	42.98	0.00	3.57	V	46.55	73.98	27.43	PK
4824	31.24	0.03	3.57	V	34.84	53.98	19.14	AV
7236	40.54	0.00	12.30	V	52.84	73.98	21.15	PK
7236	28.28	0.03	12.30	V	40.61	53.98	13.38	AV
4824	43.10	0.00	3.57	H	46.67	73.98	27.31	PK
4824	31.42	0.03	3.57	H	35.02	53.98	18.96	AV
7236	40.69	0.00	12.30	H	52.99	73.98	21.00	PK
7236	28.39	0.03	12.30	H	40.72	53.98	13.27	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	42.95	0.00	3.76	V	46.71	73.98	27.28	PK
4874	31.28	0.03	3.76	V	35.07	53.98	18.92	AV
7311	42.70	0.00	11.51	V	54.21	73.98	19.77	PK
7311	28.61	0.03	11.51	V	40.15	53.98	13.83	AV
4874	43.95	0.00	3.76	H	47.71	73.98	26.28	PK
4874	31.68	0.03	3.76	H	35.47	53.98	18.52	AV
7311	42.85	0.00	11.51	H	54.36	73.98	19.62	PK
7311	28.90	0.03	11.51	H	40.44	53.98	13.54	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	43.66	0.00	4.78	V	48.44	73.98	25.54	PK
4924	31.58	0.03	4.78	V	36.39	53.98	17.59	AV
7386	40.58	0.00	12.03	V	52.61	73.98	21.37	PK
7386	28.19	0.03	12.03	V	40.25	53.98	13.73	AV
4924	43.95	0.00	4.78	H	48.73	73.98	25.25	PK
4924	32.10	0.03	4.78	H	36.91	53.98	17.07	AV
7386	40.69	0.00	12.03	H	52.72	73.98	21.26	PK
7386	28.20	0.03	12.03	H	40.26	53.98	13.72	AV

Note:

Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

2. 52 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	40

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	42.26	0.00	3.57	V	45.83	73.98	28.15	PK
4824	30.59	0.04	3.57	V	34.20	53.98	19.78	AV
7236	40.39	0.00	12.30	V	52.69	73.98	21.30	PK
7236	28.28	0.04	12.30	V	40.62	53.98	13.37	AV
4824	42.81	0.00	3.57	H	46.38	73.98	27.60	PK
4824	30.87	0.04	3.57	H	34.48	53.98	19.50	AV
7236	40.54	0.00	12.30	H	52.84	73.98	21.15	PK
7236	28.35	0.04	12.30	H	40.69	53.98	13.30	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	40

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	42.65	0.00	3.76	V	46.41	73.98	27.58	PK
4874	30.86	0.04	3.76	V	34.66	53.98	19.33	AV
7311	40.21	0.00	11.51	V	51.72	73.98	22.26	PK
7311	28.45	0.04	11.51	V	40.00	53.98	13.98	AV
4874	42.81	0.00	3.76	H	46.57	73.98	27.42	PK
4874	30.95	0.04	3.76	H	34.75	53.98	19.24	AV
7311	40.39	0.00	11.51	H	51.90	73.98	22.08	PK
7311	28.55	0.04	11.51	H	40.10	53.98	13.88	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	40

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.15	0.00	4.78	V	46.93	73.98	27.05	PK
4924	31.00	0.04	4.78	V	35.82	53.98	18.16	AV
7386	41.05	0.00	12.03	V	53.08	73.98	20.90	PK
7386	28.38	0.04	12.03	V	40.45	53.98	13.53	AV
4924	42.90	0.00	4.78	H	47.68	73.98	26.30	PK
4924	31.04	0.04	4.78	H	35.86	53.98	18.12	AV
7386	41.11	0.00	12.03	H	53.14	73.98	20.84	PK
7386	28.59	0.04	12.03	H	40.66	53.98	13.32	AV

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

3. 106 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	54

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	42.60	0.00	3.57	V	46.17	73.98	27.81	PK
4824	30.46	0.04	3.57	V	34.07	53.98	19.91	AV
7236	40.15	0.00	12.30	V	52.45	73.98	21.54	PK
7236	28.29	0.04	12.30	V	40.63	53.98	13.36	AV
4824	42.54	0.00	3.57	H	46.11	73.98	27.87	PK
4824	30.76	0.04	3.57	H	34.37	53.98	19.61	AV
7236	40.18	0.00	12.30	H	52.48	73.98	21.51	PK
7236	28.31	0.04	12.30	H	40.65	53.98	13.34	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	54

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	43.05	0.00	3.76	V	46.81	73.98	27.18	PK
4874	31.47	0.04	3.76	V	35.27	53.98	18.72	AV
7311	40.79	0.00	11.51	V	52.30	73.98	21.68	PK
7311	28.59	0.04	11.51	V	40.14	53.98	13.84	AV
4874	43.15	0.00	3.76	H	46.91	73.98	27.08	PK
4874	31.51	0.04	3.76	H	35.31	53.98	18.68	AV
7311	40.84	0.00	11.51	H	52.35	73.98	21.63	PK
7311	28.71	0.04	11.51	H	40.26	53.98	13.72	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	54

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.13	0.00	4.78	V	46.91	73.98	27.07	PK
4924	31.29	0.04	4.78	V	36.11	53.98	17.87	AV
7386	40.54	0.00	12.03	V	52.57	73.98	21.41	PK
7386	28.21	0.04	12.03	V	40.28	53.98	13.70	AV
4924	42.17	0.00	4.78	H	46.95	73.98	27.03	PK
4924	31.45	0.04	4.78	H	36.27	53.98	17.71	AV
7386	40.60	0.00	12.03	H	52.63	73.98	21.35	PK
7386	28.29	0.04	12.03	H	40.36	53.98	13.62	AV

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

4. 242 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	61

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	42.17	0.00	3.57	V	45.74	73.98	28.24	PK
4824	30.54	0.04	3.57	V	34.15	53.98	19.83	AV
7236	40.06	0.00	12.30	V	52.36	73.98	21.63	PK
7236	28.35	0.04	12.30	V	40.69	53.98	13.30	AV
4824	42.95	0.00	3.57	H	46.52	73.98	27.46	PK
4824	30.95	0.04	3.57	H	34.56	53.98	19.42	AV
7236	40.12	0.00	12.30	H	52.42	73.98	21.57	PK
7236	28.44	0.04	12.30	H	40.78	53.98	13.21	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	61

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	43.11	0.00	3.76	V	46.87	73.98	27.12	PK
4874	31.08	0.04	3.76	V	34.88	53.98	19.11	AV
7311	40.40	0.00	11.51	V	51.91	73.98	22.07	PK
7311	28.78	0.04	11.51	V	40.33	53.98	13.65	AV
4874	43.90	0.00	3.76	H	47.66	73.98	26.33	PK
4874	31.28	0.04	3.76	H	35.08	53.98	18.91	AV
7311	40.89	0.00	11.51	H	52.40	73.98	21.58	PK
7311	28.96	0.04	11.51	H	40.51	53.98	13.47	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	61

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.11	0.00	4.78	V	46.89	73.98	27.09	PK
4924	31.31	0.04	4.78	V	36.13	53.98	17.85	AV
7386	40.96	0.00	12.03	V	52.99	73.98	20.99	PK
7386	28.45	0.04	12.03	V	40.52	53.98	13.46	AV
4924	42.15	0.00	4.78	H	46.93	73.98	27.05	PK
4924	31.84	0.04	4.78	H	36.66	53.98	17.32	AV
7386	40.95	0.00	12.03	H	52.98	73.98	21.00	PK
7386	28.44	0.04	12.03	H	40.51	53.98	13.47	AV

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

5. SU

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	41.62	0.00	3.57	V	45.19	73.98	28.79	PK
4824	30.99	0.04	3.57	V	34.60	53.98	19.38	AV
7236	40.29	0.00	12.30	V	52.59	73.98	21.40	PK
7236	28.12	0.04	12.30	V	40.46	53.98	13.53	AV
4824	41.75	0.00	3.57	H	45.32	73.98	28.66	PK
4824	31.06	0.04	3.57	H	34.67	53.98	19.31	AV
7236	40.77	0.00	12.30	H	53.07	73.98	20.92	PK
7236	28.48	0.04	12.30	H	40.82	53.98	13.17	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	42.95	0.00	3.76	V	46.71	73.98	27.28	PK
4874	30.94	0.04	3.76	V	34.74	53.98	19.25	AV
7311	40.16	0.00	11.51	V	51.67	73.98	22.31	PK
7311	28.94	0.04	11.51	V	40.49	53.98	13.49	AV
4874	43.27	0.00	3.76	H	47.03	73.98	26.96	PK
4874	31.61	0.04	3.76	H	35.41	53.98	18.58	AV
7311	40.82	0.00	11.51	H	52.33	73.98	21.65	PK
7311	29.05	0.04	11.51	H	40.60	53.98	13.38	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	41.86	0.00	4.78	V	46.64	73.98	27.34	PK
4924	30.48	0.04	4.78	V	35.30	53.98	18.68	AV
7386	40.28	0.00	12.03	V	52.31	73.98	21.67	PK
7386	28.28	0.04	12.03	V	40.35	53.98	13.63	AV
4924	42.33	0.00	4.78	H	47.11	73.98	26.87	PK
4924	30.76	0.04	4.78	H	35.58	53.98	18.40	AV
7386	40.69	0.00	12.03	H	52.72	73.98	21.26	PK
7386	28.54	0.04	12.03	H	40.61	53.98	13.37	AV

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

[RSDB Mode]

Worst case : 2.4G ch.1 802.11ax HE20 SU MCS0 Ant all & 5G ch.36 802.11ax HE20 SU MCS0 Ant all

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	**61.07**	**0.00**	**3.57**	**V**	**64.64**	**73.98**	**9.34**	**PK**
4824	**46.66**	**0.04**	**3.57**	**V**	**50.27**	**53.98**	**3.71**	**AV**
7236	41.05	0.00	12.30	V	53.35	73.98	20.64	PK
7236	28.99	0.04	12.30	V	41.33	53.98	12.66	AV
4824	60.80	0.00	3.57	H	64.37	73.98	9.61	PK
4824	45.26	0.04	3.57	H	48.87	53.98	5.11	AV
7236	40.54	0.00	12.30	H	52.84	73.98	21.15	PK
7236	28.81	0.04	12.30	H	41.15	53.98	12.84	AV

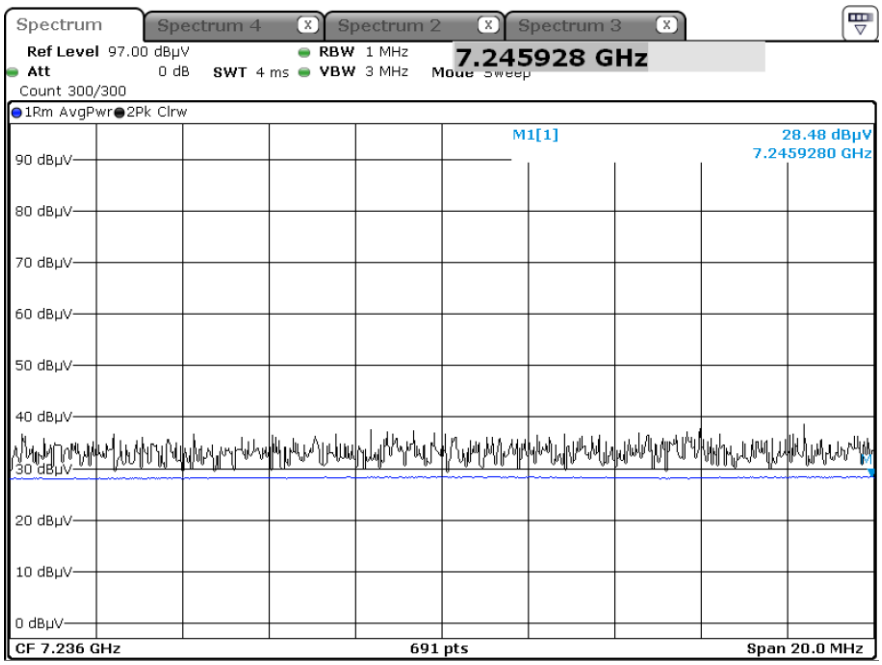
Note :

1. WLAN UNII RSDB Data refer to UNII ax Test Report.

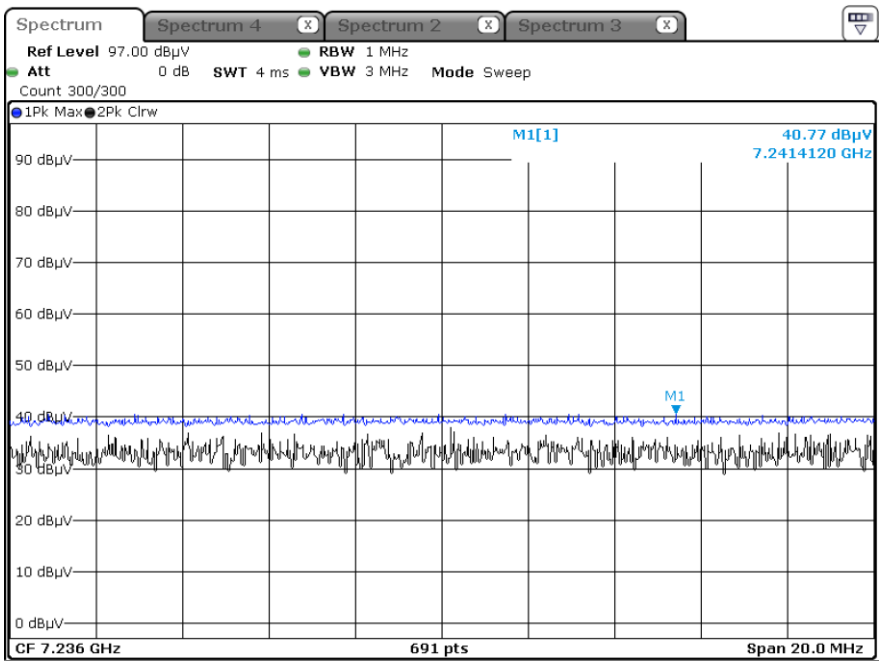
▣ Test Plots

[MIMO]

Radiated Spurious Emissions plot – Average result (802.11ax(HE20)_SU, Ch.1 3rd Harmonic, X-H)



Radiated Spurious Emissions plot – Peak result (802.11ax(HE20)_SU, Ch.1 3rd Harmonic, X-H)



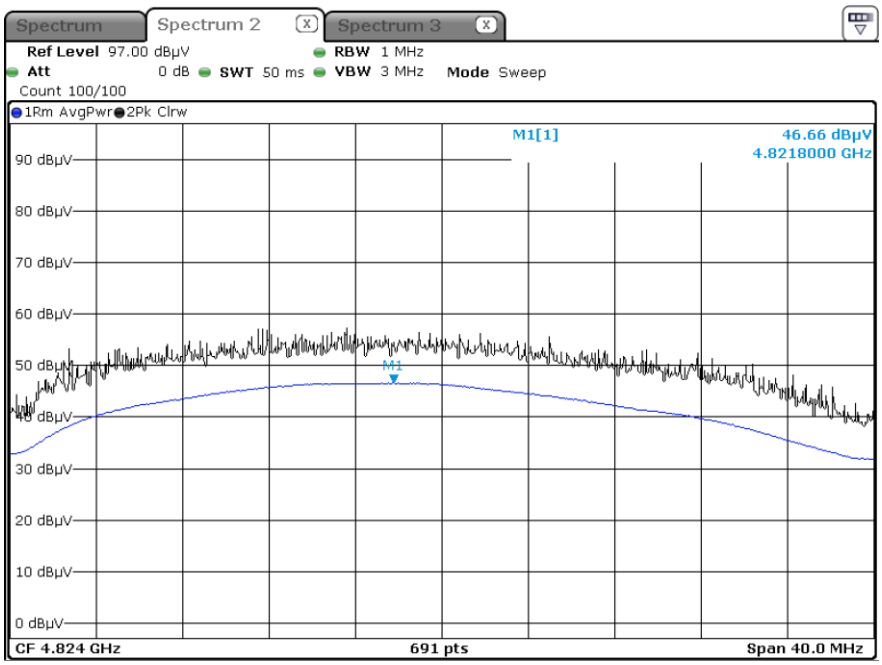
Note:

Plot of worst case are only reported.

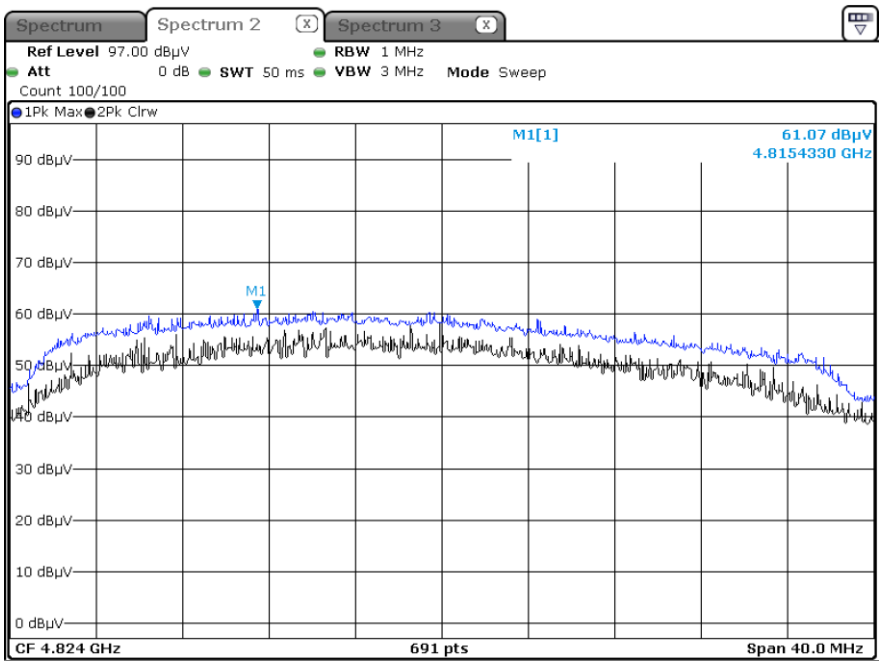
▣ Test Plots(RSDB)

[2.4G ch.1 802.11ax HE20 SU MCS0 Ant all & 5G ch.36 802.11ax HE20 SU MCS0 Ant all]

Radiated Spurious Emissions plot – Average Result (Worst case_2nd Harmonic, Y-V)



Radiated Spurious Emissions plot – Peak Result (Worst case _2nd Harmonic, Y-V)



Note: Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[MIMO]

1. 26 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	20.448	0.00	34.50	H	54.95	73.98	19.03	PK
2390.0	9.992	0.03	34.50	H	44.52	53.98	9.46	AV
2390.0	20.235	0.00	34.50	V	54.74	73.98	19.24	PK
2390.0	9.688	0.03	34.50	V	44.22	53.98	9.76	AV
2483.5	24.452	0.00	34.87	H	59.33	73.98	14.65	PK
2483.5	9.786	0.03	34.87	H	44.69	53.98	9.29	AV
2483.5	24.135	0.00	34.87	V	59.01	73.98	14.97	PK
2483.5	9.642	0.03	34.87	V	44.55	53.98	9.43	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2467 MHz
Channel No.	12 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2483.5	24.618	0.00	34.87	H	59.49	73.98	14.49	PK
2483.5	11.992	0.03	34.87	H	46.90	53.98	7.08	AV
2483.5	24.135	0.00	34.87	V	59.01	73.98	14.97	PK
2483.5	11.744	0.03	34.87	V	46.65	53.98	7.33	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2472 MHz
Channel No.	13 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
# 2484	27.850	0.00	34.87	H	62.72	73.98	11.26	PK
# 2484	15.330	0.03	34.87	H	50.23	53.98	3.75	AV
# 2485	22.915	0.00	34.87	H	57.79	73.98	16.19	PK
2485.5	30.123	0.00	34.87	H	65.00	73.98	8.98	PK
2484.5	14.153	0.03	34.87	H	49.06	53.98	4.92	AV
# 2484	27.015	0.00	34.87	V	61.89	73.98	12.09	PK
# 2484	15.231	0.03	34.87	V	50.14	53.98	3.84	AV
# 2485	22.642	0.00	34.87	V	57.52	73.98	16.46	PK
2485.5	29.994	0.00	34.87	V	64.87	73.98	9.11	PK
2484.5	14.011	0.03	34.87	V	48.92	53.98	5.06	AV

Note : # integration method Used (ANSI C63.10 Section11.13.3)

2. 52 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	23.253	0.00	34.50	H	57.75	73.98	16.23	PK
2390.0	10.009	0.04	34.50	H	44.55	53.98	9.43	AV
2390.0	23.110	0.00	34.50	V	57.61	73.98	16.37	PK
2390.0	9.874	0.04	34.50	V	44.42	53.98	9.56	AV
2483.5	28.339	0.00	34.87	H	63.21	73.98	10.77	PK
2483.5	10.412	0.03	34.87	H	45.32	53.98	8.66	AV
2483.5	28.148	0.00	34.87	V	63.02	73.98	10.96	PK
2483.5	10.287	0.03	34.87	V	45.19	53.98	8.79	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2467 MHz
Channel No.	12 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2483.5	25.664	0.00	34.87	H	60.54	73.98	13.44	PK
2483.5	11.867	0.04	34.87	H	46.78	53.98	7.20	AV
2483.5	25.368	0.00	34.87	V	60.24	73.98	13.74	PK
2483.5	11.646	0.04	34.87	V	46.56	53.98	7.42	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2472 MHz
Channel No.	13 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
#2484	25.790	0.00	34.87	H	60.66	73.98	13.32	PK
2483.5	16.000	0.04	34.87	H	50.91	53.98	3.07	AV
2484.5	32.775	0.00	34.87	H	67.65	73.98	6.33	PK
#2484	25.452	0.00	34.87	V	60.33	73.98	13.65	PK
2483.5	15.884	0.04	34.87	V	50.80	53.98	3.18	AV
2484.5	32.554	0.00	34.87	V	67.43	73.98	6.55	PK

Note : # integration method Used (ANSI C63.10 Section11.13.3)

3. 106 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	23.893	0.00	34.50	H	58.39	73.98	15.59	PK
2390.0	10.417	0.04	34.50	H	44.96	53.98	9.02	AV
2390.0	23.779	0.00	34.50	V	58.28	73.98	15.70	PK
2390.0	10.225	0.04	34.50	V	44.77	53.98	9.21	AV
2483.5	35.453	0.00	34.87	H	70.33	73.98	3.65	PK
2483.5	12.012	0.04	34.87	H	46.93	53.98	7.05	AV
2483.5	34.995	0.00	34.87	V	69.87	73.98	4.11	PK
2483.5	11.849	0.04	34.87	V	46.76	53.98	7.22	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2467 MHz. 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5	25.438	0.00	34.87	H	60.31	73.98	13.67	PK
2483.5	11.746	0.04	34.87	H	46.66	53.98	7.32	AV
2483.5	24.668	0.00	34.87	V	59.54	73.98	14.44	PK
2483.5	11.660	0.04	34.87	V	46.57	53.98	7.41	AV
2483.5	36.226	0.00	34.87	H	71.10	73.98	2.88	PK
2483.5	14.135	0.04	34.87	H	49.05	53.98	4.93	AV
2483.5	35.557	0.00	34.87	V	70.43	73.98	3.55	PK
2483.5	14.015	0.04	34.87	V	48.93	53.98	5.05	AV

4. 242 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
#2389.5	30.110	0.00	34.50	H	64.61	73.98	9.37	PK
#2389.5	17.300	0.04	34.50	H	51.84	53.98	2.14	AV
2389	34.147	0.00	34.50	H	68.65	73.98	5.33	PK
2389	17.254	0.04	34.50	H	51.80	53.98	2.18	AV
#2389.5	30.012	0.00	34.50	V	64.51	73.98	9.47	PK
#2389.5	17.125	0.04	34.50	V	51.67	53.98	2.31	AV
2389	34.109	0.00	34.50	V	68.61	73.98	5.37	PK
2389	17.012	0.04	34.50	V	51.55	53.98	2.43	AV
#2484	29.910	0.00	34.87	H	64.78	73.98	9.20	PK
#2484	16.830	0.04	34.87	H	51.74	53.98	2.24	AV
#2485	15.290	0.04	34.87	H	50.20	53.98	3.78	AV
2484.5	35.251	0.00	34.87	H	70.13	73.98	3.85	PK
2485.5	16.644	0.04	34.87	H	51.56	53.98	2.42	AV
#2484	29.312	0.00	34.87	V	64.19	73.98	9.79	PK
#2484	15.842	0.04	34.87	V	50.76	53.98	3.22	AV
#2485	14.225	0.04	34.87	V	49.14	53.98	4.84	AV
2484.5	35.012	0.00	34.87	V	69.89	73.98	4.09	PK
2485.5	15.945	0.04	34.87	V	50.86	53.98	3.12	AV

Note : # integration method Used (ANSI C63.10 Section11.13.3)

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2467 MHz. 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5	23.231	0.00	34.87	H	58.11	73.98	15.87	PK
2483.5	11.924	0.04	34.87	H	46.84	53.98	7.14	AV
2483.5	23.015	0.00	34.87	V	57.89	73.98	16.09	PK
2483.5	11.844	0.04	34.87	V	46.76	53.98	7.22	AV
2483.5	33.665	0.00	34.87	H	68.54	73.98	5.44	PK
2483.5	14.325	0.04	34.87	H	49.24	53.98	4.74	AV
2483.5	33.025	0.00	34.87	V	67.90	73.98	6.08	PK
2483.5	14.168	0.04	34.87	V	49.08	53.98	4.90	AV

5. SU

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	29.250	0.00	34.50	H	63.75	73.98	10.23	PK
2390.0	16.324	0.04	34.50	H	50.87	53.98	3.11	AV
2390.0	28.996	0.00	34.50	V	63.50	73.98	10.48	PK
2390.0	16.105	0.04	34.50	V	50.65	53.98	3.33	AV
2483.5	29.620	0.00	34.87	H	64.49	73.98	9.49	PK
2483.5	16.483	0.04	34.87	H	51.40	53.98	2.58	AV
2483.5	29.542	0.00	34.87	V	64.42	73.98	9.56	PK
2483.5	16.332	0.04	34.87	V	51.25	53.98	2.73	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2467 MHz. 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2483.5	23.351	0.00	34.87	H	58.23	73.98	15.75	PK
2483.5	11.783	0.04	34.87	H	46.70	53.98	7.28	AV
2483.5	23.017	0.00	34.87	V	57.89	73.98	16.09	PK
2483.5	11.642	0.04	34.87	V	46.56	53.98	7.42	AV
2483.5	29.759	0.00	34.87	H	64.63	73.98	9.35	PK
2483.5	8.135	0.04	34.87	H	43.05	53.98	10.93	AV
2483.5	28.645	0.00	34.87	V	63.52	73.98	10.46	PK
2483.5	7.996	0.04	34.87	V	42.91	53.98	11.07	AV

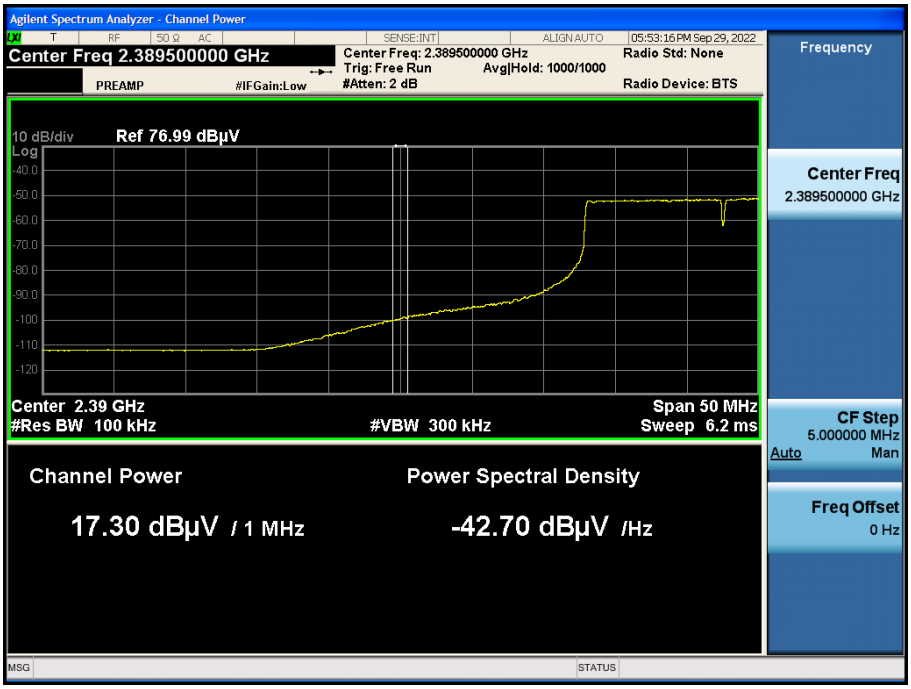
▣ Test Plots

[MIMO]

(242T RU61) – X-H

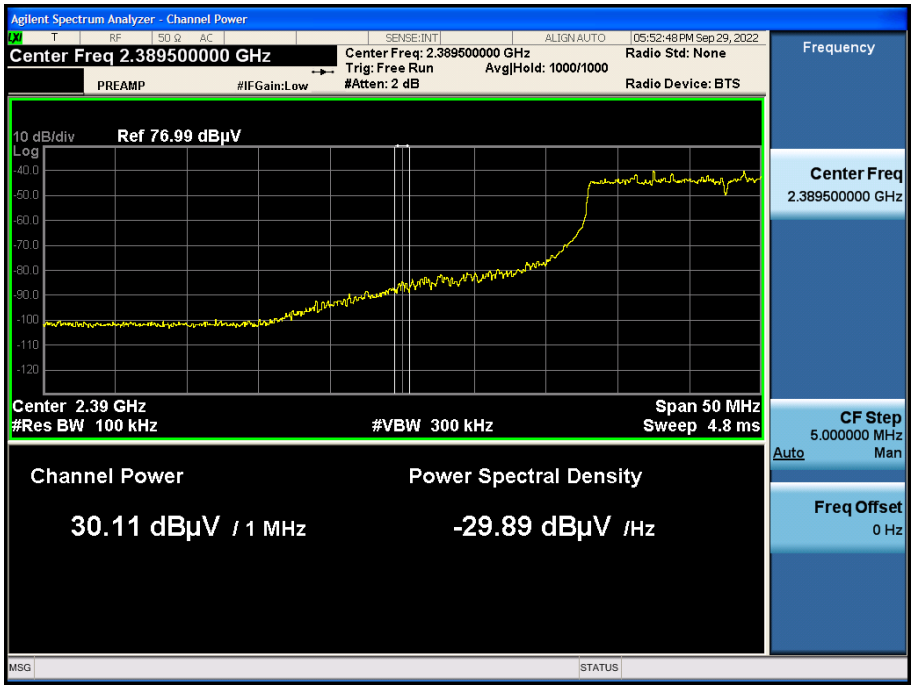
Radiated Restricted Band Edges plot – Average result (802.11ax(HE20), MCS0, Ch.1)

Integration method Used_ 2389.5 MHz



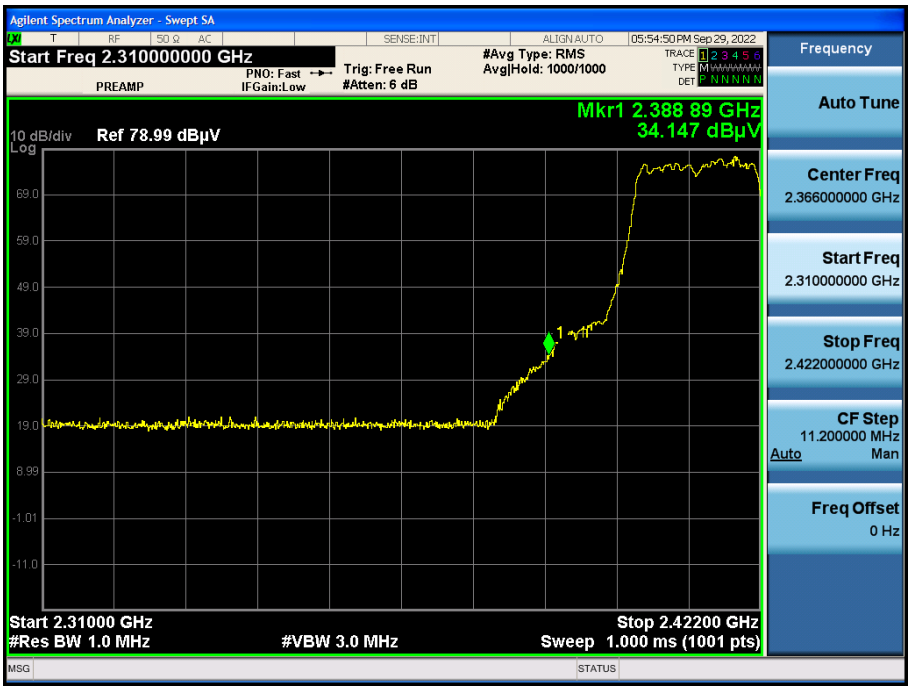
Radiated Restricted Band Edges plot – Peak result (802.11ax(HE20), MCS0, Ch.1)

Integration method Used_2389.5 MHz



Radiated Restricted Band Edges plot – Average result (802.11ax(HE20), MCS0, Ch.1)

Radiated Restricted Band Edges plot – Peak result (802.11ax(HE20), MCS0, Ch.1)



Note:

Plot of worst case are only reported.

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	06/14/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Keysight	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/18/2023	Annual
DC Power Supply	E3646A	Agilent	MY40002937	12/14/2022	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	06/14/2023	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/22/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	03/24/2024	Biennial
Horn Antenna (15GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	102168	07/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
High Pass Filter	WHK3.0/18G-10EF	Wainwright Instruments	8	01/21/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	25	01/21/2023	Annual
Attenuator (3 dB)	18B-03	Api tech.	1	01/21/2023	Annual
Attenuator(10 dB)	8493C-10	Agilent	08285	01/21/2023	Annual
Power Amplifier	CBLU1183540	CERNEX	22964	01/21/2023	Annual
Power Amplifier	CBL06185030	CERNEX	22965	01/21/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2210-FC030-P